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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

STUDY OF
PRE-REGULAR PERIODIC
MOVEMENTS IN MOLECULES



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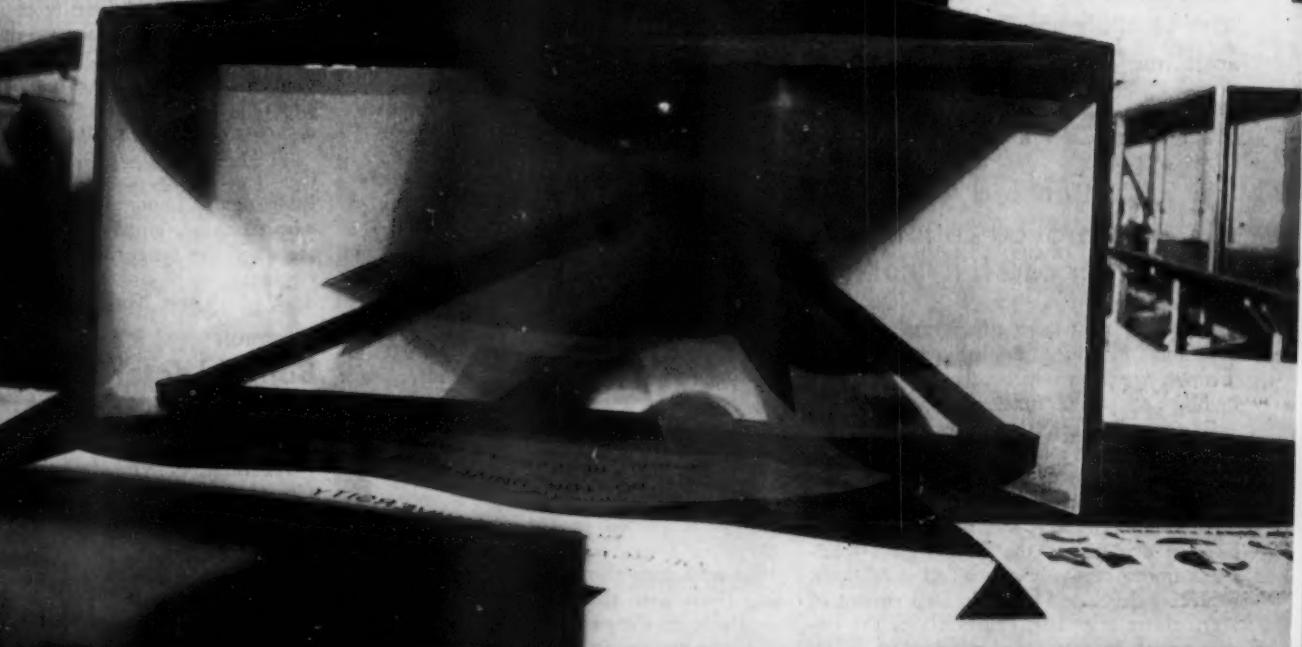
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Aerial Photo Lens

See Page 35

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MEDICINE

Vein Grafts as Remedy

Water on the brain may some day be treated through use of vein grafts, experiments with animals show. Method must still be perfected for use on humans.

► VEIN GRAFTS may some day in the future be used to remedy water on the brain, known medically as hydrocephalus.

Experiments with animals pointing toward this possible future treatment of human patients were reported by Dr. Brian Blades of George Washington University School of Medicine in Washington at a conference on blood vessel grafts held at the National Institutes of Health.

Dr. Blades emphasized that the work is still experimental and there are "a lot of wrinkles to be worked out" before the method can be used on humans.

The vein grafts are used to connect the subarachnoid space around the spinal canal with a portion of the small intestine in order to drain off the excess fluid which constitutes the water on the brain condition. Heretofore surgeons have tried to remedy hydrocephalus by making new openings into the ventricles of the brain or have tried to reduce the amount of fluid secreted by an operation on the choroid plexus in the

brain. Occasionally these operations have produced cures.

When water on the brain is caused by an obstructing tumor, it can be cured by removal of the tumor if done early enough. The condition is sometimes caused by infection, such as meningitis, and sometimes by congenital abnormality.

When vein and artery grafts are used to repair damaged blood vessels, they can be quite long, Dr. Blades and Dr. William S. McCune, also of George Washington University School of Medicine, find. Grafts consisting of the entire aorta of a dog, and extending almost nine inches in length, have been successful, they reported.

Proper nourishment of the graft is important in keeping it effective as a blood vessel, they emphasized. The graft will get most of its blood for nourishment from tissues around it rather than from the blood running through its bore, their experiments show.

Consequently they advise bedding the graft in blood-rich tissues.

Science News Letter, January 19, 1952

AGRICULTURE

More Food From Cotton

Better fed and healthier South foreseen through use of improved cottonseed meal produced by heat treatment under carefully controlled conditions.

► MORE FOOD from cotton, and a better fed and healthier South, are foreseen through use of an improved cottonseed meal in hog and poultry feed.

Cottonseed meal, the material left after cotton seeds have been squeezed of their oil, is a high protein food. Inexpensive, protein-rich rations for animal feed are scarce all over the country, but they are particularly in demand in the South. Heat treatment under carefully controlled conditions, a process developed by U. S. Department of Agriculture scientists, brings about the improvement in cottonseed meal.

Farmers in the South are now limited in their use of cottonseed meal in poultry feed to 9% of the total protein intake. Before the end of 1952 it is expected that the improved cottonseed meal will be available and that it can be fed interchangeably with the soybean protein that now makes up about 60% of diet protein for poultry.

Present use of cottonseed meal in poultry and hog feed is limited because the feed

contains substances that check the growth of these animals. One of the substances is gossypol, the yellow pigment in cotton seeds. Gossypol produces off-colored yolks in the eggs from chickens that have been fed too much of it.

Scientists are trying to find out what other substances in the pigment, or color, glands of cotton seed are responsible for the meal's growth-inhibiting effects. The heat treatment ties up the inhibitors, binding them with the protein so they are not available to the animal.

If the processing temperature is too high, however, some of the protein value is also destroyed. The new commercial process depends on careful control of the amount of heat, enough to kill the growth-inhibiting substances, but not enough to destroy the protein content. No new equipment is required by the processing plant to use the new method.

Since southern farmers must now import soybean meal, the improved cottonseed meal

will mean much cheaper hog and poultry feed bills. Thus more animals can be raised on the same amount of money spent for rations.

Cottonseed meal from this year's crop is now undergoing final tests on farms. Next year's cotton crop, if present tests are as successful as it is believed they will be, can be processed in the new way, Dr. George W. Irving, assistant chief of the U. S. Department of Agriculture's Bureau of Agricultural and Industrial Chemistry, told SCIENCE SERVICE. Although ton quantities of experimental lots are now being produced in several mills, the improved meal is not yet available commercially.

Science News Letter, January 19, 1952

BIOPHYSICS

Most Powerful X-Ray Attack on Cancer Begun

► THE WORLD'S most powerful cancer-fighting X-ray machine, a 70-million-volt medical synchrotron at the University of California School of Medicine, San Francisco, has gone into operation.

The 16-ton instrument, built by General Electric, was made to test the possibility that its ultra-high energy radiations may be more effective in treating deep-seated cancers than X-rays in common use that range up to a million volts.

Work with betatrons in the 20-million-volt range at the University of Illinois indicates that it is possible to put a higher dose of radiation in deep-seated tumors than with lower voltages. Theoretical calculations indicate that at 70 million volts the effect may be even more pronounced.

Dr. Robert S. Stone, director, and Dr. Gail D. Adams, associate director, of the Radiological Laboratory which houses the new machine, emphasize that there is no certainty the synchrotron will prove more efficient.

Science News Letter, January 19, 1952

INVENTION

Boiled Water and Tea Extract Tobacco's Nicotine

► A SCIENTIST of Argentina received United States patent 2,582,075 for a process of extracting nicotine from tobacco with the use of boiled water and the ordinary tea used as a beverage. His name is Mentore Severi and his address is Buenos Aires.

The process requires many days of soaking. The tobacco is softened for a period of five to ten days in water that has previously been boiled and which is drawn off and renewed every 24 hours. Then it is soaked for 12 hours in an infusion of tea. Another treatment of boiled water followed by a tea infusion follows. The tobacco, when dried, is practically free from nicotine and its original appearance has not been changed.

Science News Letter, January 19, 1952

ENGINEERING

Spherical Aerial Photos

Spherical lens for projecting negatives on a shell is now being tested. Rotary shutters for eyes and machine aid map plotting.

See Front Cover

► PHOTOGRAPHS AT least twice as good as those now being taken from airplanes can be made with a spherical lens and a negative on a spherical shell. The spherical projection lens, only one of its kind, is new and was shown for the first time to the meeting of the American Society of Photogrammetry in Washington.

The device looks like the top one-third of a globe set on top of and about six inches from the top one-third of another globe. One of the cut-off shells is the negative, the other the lens projector. In the photograph on the cover of this week's SCIENCE NEWS LETTER, the spherical shell with the negative has been replaced, in order to show the projection lens to better advantage, with a plain white shell.

Photographs of aerial views have been made on spherical shells before, but previously all methods of projecting such a curved negative have given distortion. Putting the negative on a properly curved surface gives a photograph free from distortion at any point, but without an accurate projection method, the spherical negatives were of little use.

The camera can now take a picture on the spherical shell at one time of all that a person could see if he looked around in a complete circle from an airplane. When the spherical lens is used to project such a negative, there is no change in the proportions. At four to six feet, it gives an absolutely accurate, flat projection of the negative taken on the one-third of a shell.

Credit for originating the spherical lens idea goes to Dr. James Baker of Harvard Observatory. The projection unit was perfected by Drs. Claus Aschenbrenner, Duncan Macdonald and Ray Dussalt of Boston University's Optical Research Laboratory. Their work was done under contract with the U. S. Air Force's Wright Air Development Center, Wright Field, Dayton, Ohio.

Only about 30 spherical negatives have been taken so far in this program to find out how effective such a shell lens projection would be in operational work.

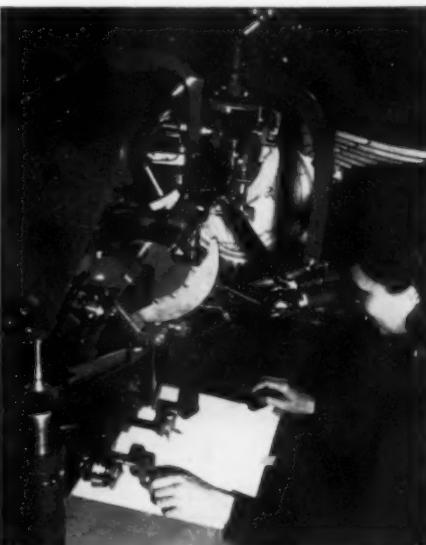
Rotary Shutters for Eyes

► GREAT IMPROVEMENT in getting information from aerial maps is foreseen through use of a rotating shutter device shown for the first time at the Society's meeting.

The shutters are worn by the operator who is interpreting the photographs, making him look like a man of the future. Each shutter revolves 1,800 times per minute, but the one for the left eye is 90 degrees out of phase with that for the right. The Kelsh-plotting instrument on which the aerial maps are scanned is also equipped with two of the fast rotating shutters, one for each of its two photographic projectors. These shutters also rotate 1,800 times per minute and the left one is 90 degrees out of phase with the right one.

Thus a series of pictures, alternating so fast they appear as one, are thrown by the projector, but because of the timing the right eye sees only the picture shown by the right hand side of the instrument and the left eye sees only that from the left.

With each eye seeing only one picture, but both of them seeing two, each set of images fuses to give a three-dimensional picture.



PRECISION PLOTTER — The Stereosimplex, an Italian-made instrument for plotting maps from aerial photographs, is the only one of its kind in the United States. Using it, an operator can plot from photographs taken by cameras having different focal lengths, not possible with U. S. instruments.

The instrument was developed by the Engineer Research and Development Laboratories at Fort Belvoir, Va. One of its advantages is that it can be used with color pictures. It also eliminates the need for color filters, now used to get the three-dimensional effect, thus considerably increasing the amount of light thrown by the projectors and making the photograph look more natural to the operator.

Better Plotting Instrument

► PHOTOGRAPHS TAKEN by fast flying jet planes will reveal more vital information through use of a brand new instrument.

The Stereosimplex, as the machine is called, is made in Italy and is the only one of its kind in the U. S. It arrived just in time to be put on exhibit in Washington at the meeting of the American Society of Photogrammetry by the U. S. Naval Photographic Interpretation Center at Anacostia.

They imported the instrument, since nothing like it is made in this country, in order to test a new system of mapping from aerial photographs. The instrument is for plotting the information contained on aerial photographs. Its great advantage is that an operator can work on photographs taken by cameras with different focal lengths. U. S. plotting machines are set up to be used with photographs taken at a fixed focal length, usually six inches.

Photographs by cameras having much shorter focal lengths can thus be plotted with this new instrument. The shorter the focal length of a camera, the clearer is the picture that it will take of a wider area at one time. Short focal length cameras have just gone into operational use on a test basis.

With present equipment, in order to get contour maps that are correct to within one foot, the photographing plane must fly at 2,500 feet. Using the new instrument, aerial photographs can be taken at 10,000 feet that will give contour maps correct to within nearly half a foot.

"This instrument is the newest and one of the most outstanding pieces of equipment at the meeting," Talbert Abrams of Lansing, Mich., president of the Society, declared.

It is Model 2 of the Stereosimplex and was made by Santoni in Italy.

Map Ground Heights

► A SIMPLER instrument for mapping heights of ground terrain using only two aerial photographs was shown to the American Society of Photogrammetry meeting in Washington. Completed just in time to be put on exhibition, it is the first device of its type to be made.

Known as the Hypsometer, the instrument makes use of parallax—the apparent

change in the way objects look when viewed from different positions. It has been adapted for use with the oblique photographs taken by aerial cameras. Only the horizon line is needed as a reference mark, the horizons on the two photographs being lined up with an etched line on the flat surface of the instrument.

Corresponding points on the photos are projected to a fixed base line by means of two arms. There the parallax is measured, and using the parallax formula, the elevation differences are computed.

The Hypsometer is made by the Union Instrument Corp. of New Jersey for the U. S. Army's Engineer Research and Development Laboratories at Fort Belvoir, Va.

Speedy Camera Shutter

► A NEW shutter for aerial cameras, designed for use in photo reconnaissance, gives more accurate pictures at higher flying speeds than with previous shutters. The clearer the photographs, the easier it is for U. S. Air Force photo-interpreters to spot camouflaged guns and troop concentrations.

The shutter, built into a drawer so that it can be repaired easily, has two sets of blades. One opens and the other closes, almost at the same instant. The lightning-like movements are what increase the efficiency of the shutter, giving clearer pictures for the same time exposure.

For inventing this device, known as the Fairchild Rapidyne, Frederick P. Willcox of Fairchild Camera and Instrument Corporation was awarded the 1952 Photogrammetric Award of the American Society of Photogrammetry.

Science News Letter, January 19, 1952

Grass silage, now popular on American farms, is made from any of the green crops that might otherwise be dried and made into hay.

Question Box

ASTRONOMY

Why is it believed that radio stars may be nearer than those we see? p. 38.

BIOCHEMISTRY

How long do white blood cells live? p. 40.

MEDICINE

In what way are fat men better insulated against cold? p. 44.

Photographs: Cover, and p. 35, D. M. Yap; p. 37, Dr. W. C. Lowdermilk; p. 38, California Institute of Technology; p. 42, U. S. Air Force; p. 43, Bethlehem Steel Company.

NUTRITION

What food factors are blamed for the illness of tourists to Mexico? p. 47.

PLANT PATHOLOGY

In how many states have trees now been hit by oak wilt? p. 43.

SEISMOLOGY

How is the sound of earthquakes made audible? p. 38.

BIOPHYSICS

Ward Off Atomic Radiation

► TO INCREASE your chances of surviving radiation death when the A-bombs fall, take a cocktail or other alcoholic drink and eat a steak when you hear the warning siren.

This action seems to be justified by a discovery of Drs. Edith Paterson and Joyce J. Matthews at Christie Hospital and Holt Radium Institute, Manchester, England.

Alcohol drunk 80 and 20 minutes before irradiation saved more than a fourth of a group of mice exposed to killing doses of radiation, these scientists discovered.

When they gave mice salt water before irradiation, all the mice died. Of the group that got the alcohol, only 63% died.

Alcohol taken immediately after irradiation and again one hour later was not effective in saving the mice.

Cysteine, one of the protein building blocks found in meats, had a greater protective effect when injected into the veins of the mice than the drinks of alcohol, which suggests eating steak or other protein food along with the alcohol for possible protection against irradiation.

The alcohol given the mice was diluted with salt solution to a concentration of 10% by volume. The mice got about a fourth of a teaspoon (one milliliter) of this 80 minutes and again 20 minutes before the irradiation.

Alcohol at a concentration of 5% was about equally as effective as the 10% concentration.

The protective effect of the alcohol was apparently not related to its anesthetic effect, since nembutal and ethyl carbamate, given in anesthetic doses, were not effective.

Discovery of alcohol's protective action for mice exposed to killing doses of radiation is announced in the journal *NATURE* (Dec. 29, 1951). Because this is a report

to fellow scientists, it does not point out the fact, obvious to scientists, that since men are not mice they may not get the same protective effect from alcohol taken before irradiation.

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"SABO" WORKS—Shown here is one of the main weapons—check dams in stream channels—used by the Japanese in fighting the battle of stream erosion. Revegetation of the eroded slopes is a related activity. Designs and results of Sabo Works need thorough investigation.

NATURAL RESOURCES

Japanese Battle Erosion

People slowly losing hard-fought contest for their land. A relatively new land, geologically, rainfall is high and much material is carried away.

► THE JAPANESE people are slowly losing a hard-fought contest for their agricultural lands with the geological forces of erosion. This is the opinion of Dr. Walter C. Lowdermilk, who went to Japan to survey the water resources and related land use. He went as a visiting expert consultant to the Allied occupation forces.

Japan, he explained, is a relatively new land, in terms of geologic time. Rainfall in Japan is extremely high. Therefore the process of erosion of the high areas into V-shaped valleys by short, rushing streams and the carrying of materials down to the lowlands is relatively fast.

Billions of yen have been spent and more billions will be spent in this battle against the normal geologic processes and in reclamation of new land, but the Japanese people are still losing ground, literally and figuratively, according to Dr. Lowdermilk. Most of the work being done is only to try to save the land already under cultivation. Even more of this land is lost than

new land is gained by reclamation. Meantime, the country's population continues to grow.

Dr. Lowdermilk called for a full scale evaluation of work already being done and the gathering of more information about the geological processes going on.

The battle lines of the contest in which the Japanese are engaged lie in the upstream valleys that cradle flashy storm floods and rivers containing boulders, sand and gravel. Levees and dikes which are built to keep the floods out of rice crops constantly have to be built higher and higher as the water carries down more material from the mountains. More attention to flood detention basins and holders is needed.

The basic line of attack should be to reduce the cutting and transporting power of torrential floods. Normal geological erosion, which is so fast in Japan, cannot be slowed down, only by stopping the over-cutting of forests, or by soil conservation

measures on sloping lands or by building levees.

One of the main weapons is "Sabo" works. This is a Japanese term to designate works of check dams in stream channels and revegetation of eroding slopes as related and supplemental activities. Dr. Lowdermilk called for a thorough investigation of principles, designs and results of Sabo works.

As one basic way of getting at the problem for the whole nation, Dr. Lowdermilk called for the treatment of the Tone River basin as a pilot project of integrated resource development and improvement. The basin, he pointed out, is of sufficient size and development and contains a wide enough range of further possibilities to serve as such a pilot project.

Dr. Lowdermilk is now a consultant on soil conservation and land development of the U. N. Food and Agriculture Organization with an assignment to the Israeli government for a year.

Science News Letter, January 19, 1952

ICHTHYOLOGY

Fishermen Can Tell Tall Stories of This Lake's Fish

► FISHERMEN WHO like to be truthful when they state their catch was "Sooo big" should try Lake Mendota, Wis. In the last 35 years, the average weight of each yellow perch caught has jumped from one-tenth of a pound to more than one-half of a pound.

This great increase is due to periodical cleaning out of the fish population by disease, John E. Bardach, a former University of Wisconsin biologist now with Iowa State Teachers College, believes. The same amount of food is available for the fish to eat, and when there are fewer fish, the young get more food. And young fish use their food more effectively than old ones.

About 150,000 perch are caught each year at the present time, so that pressure from anglers does not have much effect on the ups and downs of the fish population.

Science News Letter, January 19, 1952

HORTICULTURE

Wild Figs Are Sought On Mexican Expedition

► A SEARCH for wild, edible species of figs will be made in Mexico by Dr. I. J. Condi, emeritus professor of subtropical horticulture at the University of California's Citrus Experiment Station at Riverside. When cross-bred with those grown commercially in the United States, it is hoped that the wild figs will improve the flavor, size and disease-resistant qualities.

Brought to Mexico 500 years ago from Spain, the fig has had a longer opportunity to establish new varieties there than anywhere else in the New World.

Science News Letter, January 19, 1952

ASTRONOMY

Radio Stars Probably Nearer Than Those We See

► RADIO STARS probably are not as near the earth as astronomers originally estimated. Yet some of these stars whose noisy hisses are picked up here on earth may be nearer our solar system than the closest of stars that shine brightly in the night sky.

Four of the noisiest stars are probably at least ten million million miles from the earth, F. G. Smith of Cavendish Laboratory of Cambridge University reports in the British scientific journal *NATURE* (Dec. 1). These stars are in the constellations of Taurus the bull, Virgo the virgin, Cygnus the swan, and Cassiopeia.

None of these four stars can possibly be closer than a million million miles, Mr. Smith's observations indicate. The ones in Cygnus and Cassiopeia cannot be nearer than four million million miles.

The sun, our own private star, is both bright and noisy. The next nearest visual star is Proxima Centauri in the southern constellation of the centaur. This star, too faint to be seen without a telescope, is some 25 million million miles away. Any of these four radio stars, which are heard but probably have never been seen, may be nearer us than Proxima Centauri.

To pinpoint the exact location of these noisy stars against a background of distant visual stars is most difficult. So Mr. Smith estimated the change in the position of these radio stars in relation to each other, rather than figuring how they move against a background of more distant stars as the earth speeds around the sun.

Science News Letter, January 19, 1952

TECHNOLOGY

All-Glass Paper Is Effective Air Filter

► ALL-GLASS PAPER, a new product composed entirely of glass fibers with nothing added, has been developed at the National Bureau of Standards.

It is the first all-glass paper ever made, Bureau officials state. In it commercially available fine glass fibers were used. This raw material was mixed with water and formed into continuous sheets on a semi-commercial paper-making machine.

This all-glass paper seems particularly suitable for use as filters in gas masks and respirator used by fire fighters, industrial and medical workers and military personnel. In gas-mask tests in a smoke-filled room only one smoke particle in 100,000 passed through it.

The development of this paper was a joint project of the Bureau of Standards and the Naval Research Laboratory. The scientists of the Bureau responsible for it are M. J. O'Leary, J. K. Missimer, J. J. Erving, and B. W. Scribner. The Navy scientists are T. D. Callinan and R. T. Lucas.

Science News Letter, January 19, 1952



AUDIBLE EARTHQUAKES—Dr. Hugo Benioff is shown here with the seismic tape recorder he devised for continuously recording the different vibration frequencies of earth shocks.

SEISMOLOGY

Quakes' Sound Recorded

Earth's vibrations, amplified and recorded on magnetic tape, then played back at an increased speed, give new method of measuring energy distribution of shocks.

► EARTHQUAKES ARE being sound recorded at the Seismological Laboratory of the California Institute of Technology in Pasadena.

The earth's vibrations acting on a pendulum seismograph generate a small electric current. This is amplified and fed into a magnetic tape recorder, which operates at the slow speed of one-half millimeter per second.

When this is played back, speeded up to about 15 inches per second, the low frequency vibrations are raised to a frequency that can be heard through a loudspeaker.

When quakes are speeded up in this way 600 times, a local shock sounds like a pistol shot and a distant quake like a ten-strike in a bowling alley.

Dr. Hugo Benioff, who devised the new recorder, was not interested in making quakes audible but in having a new method of measuring the energy distribution of the different vibration frequencies in the shocks recorded.

To aid earthquake research, Dr. Beno Gutenberg, director of the Laboratory, announced that new equipment is being installed on Palomar Mountain. This will

enable the station there to record more earthquake characteristics than received by any other seismographic station, Dr. Gutenberg states.

As the nearby 200-inch Hale telescope of the Palomar Observatory furnishes information on previously unexplored reaches of space, so will the newly-equipped station reveal more of the earth's secrets than ever before.

The equipment will include two electromagnetic linear strain seismographs. These instruments record strains—rather than ground displacement—to which the earth is subjected by seismic waves. They provide information which cannot be obtained from the usual pendulum type of seismograph.

The new instruments are sensitive to a strain as small as one billionth of an inch per inch. Their sensitivity is indicated by the performance of similar devices installed underneath the Caltech Laboratory in Pasadena. These record not only the footsteps of a person walking through the Laboratory but also compression of the rock beneath it resulting from the person's weight.

Another new instrument being installed at Palomar is a vectorial recorder which photographs a pattern—roughly 5,000 times

enlarged—of the earth's surface motion in two dimensions. The record obtained shows the motion of the earth's surface as it might be seen through a stationary microscope suspended in space. This record makes it possible for seismologists to determine at a glance the kind of movement in a seismic wave instead of going through a laborious and seldom undertaken point-by-point computation by comparison of records.

A third new installation at Palomar—a tripartite seismograph—will indicate accurately and more quickly the direction from which earthquake waves and the faint microseismic waves arrive at the station. The latter vibrations (microseisms) are recorded when the globe is earthquake-free and the earth's crust is considered to be at rest. They seem to be associated with the motion of the sea and, in fact, increases in microseismic intensity sometimes make it possible to locate a storm at sea.

Science News Letter, January 19, 1952

GEOLOGY

Yellowstone Geyser Erupts After 60 Years

► MOST IMPORTANT event of 1951 concerning geysers is the eruption, for the first time in nearly 60 years, of Splendid Geyser in Yellowstone National Park.

Since 1892, when it became dormant, there has been no proved natural eruption of this geyser. Since 1892 the nearby geyser, Daisy, has been erupting frequently and with considerable regularity at intervals of approximately one every hour and 40 minutes. Since then, Daisy has played about 4,500 times each year, during all of which time until this year the Splendid lay quiet.

Old Faithful continued to put on its regular performance, but fewer people were observed watching the show. The fence that has been erected to protect the geyser from too-curious visitors during the winter season is leaving scars in the base of Old Faithful's cone, and park naturalists are searching for some other way of protecting the geyser.

During 1951, 74 of the named hot springs were observed in eruption while 45 unnamed geysers were seen playing. A few of the major geysers were unusually active during the year. Besides the usual and dependable performers, such as Old Faithful, other geysers that put on a regularly good show were Splendid, Giant, Mastiff and Catfish.

The rejuvenation of the Splendid, after its long quiet period when naturalists had thought it dead and Daisy the successor, is aiding the understanding of geysers' activities. It has helped to show, in a spectacular manner, that there is an exchange of function between geysers which are connected underground. George D. Marler, park naturalist, states that the length of time between this exchange is not only indefinite, but long.

Science News Letter, January 19, 1952

MEDICINE

Virus Disease Barrier

Body tissue may contain a sterilizing barrier to the progress of infection. Barrier consists of jelly-like mass holding tissue together.

► EXISTENCE IN the body tissues of "a sterilizing barrier to the progress of infection" by disease viruses is suggested in experiments by Drs. F. and M. L. Duran-Reynals of Yale University School of Medicine in New Haven, Conn.

The barrier consists of a jelly-like mass which holds tissues together and which scientists call the ground substance.

Hyaluronic acid, an important chemical component of this ground substance, can inactivate cowpox virus, the Yale scientists have discovered. This ground substance chemical can also inactivate the virus of Russian encephalitis virus, Dr. Alice E. Moore of Sloan-Kettering Institute, New York, found, thus confirming the results of the Yale scientists.

Several of the conditions and phenomena observed in the Yale experiments "duplicate what takes place" during virus infection in animals, the scientists point out. For one thing, the concentration of hyaluronic acid they used was about the same as its assumed concentration in the ground substance of several tissues.

When they added hyaluronidase, the "spreading" chemical that breaks down hyaluronic acid, the inactivating effect on the virus of the acid was brought to a maximum.

In their experiments, the virus was grown in a culture medium containing cells. The acid inactivated the virus in the fluid surrounding the cells but not the virus in the cells. This corresponds to the generally recognized fact that viruses which get inside cells in the body are protected against injurious agents.

The investigation should be expanded, the scientists caution, before the suggestion of the findings is taken as a conclusion. But if the results do in any way duplicate what happens in the body during infection, it could be assumed that hyaluronic acid and perhaps other similar chemicals of the ground substance act to inactivate viruses. This would make the ground substance a sterilizing as well as a mechanical barrier to the progress of germs in the body.

Details of the experiments are reported in the journal *SCIENCE* (Jan. 11).

Science News Letter, January 19, 1952

BIOCHEMISTRY

Anti-Malarial Synthetic

New, potentially powerful man-made remedy for malaria perfected from hydrangeas and an ancient Chinese medicinal plant related to hydrangea.

► HYDRANGEAS THAT bloom at Easter, an ancient Chinese medicinal plant related to the hydrangea, and a team of scientists at Lederle Laboratories have given the world a new, potentially powerful synthetic remedy for malaria.

The new synthetic drug, pending registration of a trademark, is being called Ch'ang Shan. This is the name of the plant the Chinese used 3,000 years ago as a remedy for malaria. The two are not identical, since the synthetic drug has been modified to make it less toxic than the anti-malaria chemical found in the Chinese plant.

Tests on laboratory animals show the new drug to be 80 to 100 times more effective than quinine, the cinchona tree chemical used as a malaria remedy in the western world for centuries. Lederle scientists are hopeful that clinical tests on human subjects, now under way, will show it to be better than other synthetic antimalarials.

Results of these tests, however, are not yet ready for reporting.

The scientists at Lederle who developed the new drug are: Dr. Benjamin Duggar, Frank Ablondi, Dr. Brian Hutchings, Dr. R. B. Baker, Dr. Reginald Hewitt and Wyeth Williams, working under the direction of Dr. J. H. Williams.

Work on this drug started more than five years ago. It was stimulated by the shortage of quinine during World War II. Ch'ang Shan roots from China were also in short supply, so the first step was to find a related plant that might yield an anti-malarial chemical. This was found in the Easter variety of hydrangea from certain greenhouses. Chemical analysis of the hydrangea chemical gave an empirical formula of $C_{18}H_{19}N_{30}O$. Further work led to the structure and synthesis of the new drug.

Science News Letter, January 19, 1952

BIOCHEMISTRY

White Cells in Blood Last Over Dozen Days

► WHITE CELLS in human blood live on the average 12 days, 19 hours and 12 minutes, Drs. Daniel L. Kline and Eugene E. Clifton of Yale University School of Medicine, New Haven, Conn., report.

White blood cells play an important part in defending the body against disease germs. Their life span has heretofore been estimated to vary from less than an hour to three weeks.

The Yale scientists got their figure for the white blood cell's lifetime by giving small doses of radioactive phosphorus to patients whose white blood cells were normal. The radioactive chemical then became incorporated into the desoxyribose nucleic acids of the white blood cells as they were formed in the bone marrow.

A little blood, less than an ounce, was taken from the patients 24 and 48 hours after they were given the radioactive chemical and then every two days for three weeks. By separating the white cells from the rest of the blood and examining them for radioactive phosphorus, the scientists were able to tell how long these tagged cells stayed in the circulation and lived.

Details of the experiments and the calculations are reported to fellow scientists in *SCIENCE* (Jan. 4), the official publication of the American Association for the Advancement of Science.

Science News Letter, January 19, 1952

AERONAUTICS

Develop Jet Airliners Without Government Money

► GOVERNMENT FINANCIAL aid is not needed in the United States to develop jet-propelled commercial transport airplanes, Admiral Emory S. Land, president of the Air Transport Association of America, stated in Washington. But government money is needed for testing jet aircraft so that the agencies having to do with their certification will have facts on which to base approval of such planes.

Several of the U. S. carriers are studying the jet problem, he stated, and have definite ideas as to the type of jet transport which should be developed for commercial use. They have a strong feeling that jet transports should be developed by the industry in the same manner as the present large, luxurious transports now in use were developed.

America now has several military bombers which are powered by jet engines. The eight-engined Boeing XB-52, now being readied for flight, is one. The six-engined Air Force bomber, the Boeing B-47 which crossed the continent in 1948 at an average speed of better than 600 miles an hour, is another. But America is not yet building

a jet-propelled commercial transport as far as is known. However, it is known that several American airplane builders have such planes under consideration.

Britain has constructed a jet-propelled airliner which has been making successful air test flights during the past two years. Canada has also constructed one which has already visited several American airports. Both of these nations expect to put jet-propelled transports into commercial use in the near future. They will be on long-distance routes where rapid travel is desirable.

Science News Letter, January 19, 1952

PUBLIC HEALTH

Safety Rule for Skiers: Go Slow

► SINCE A cold, snowy winter is forecast for this year, many of you will be going skiing. Probably a good many will take up this winter sport for the first time.

The sport is far less dangerous than it looks, yet accidents and injuries do occur. One important safety rule for the skier is, Go Slow. In skiing as in motoring, a big factor leading to accidents is too much speed in relation to conditions. Too often a beginner will attempt a steep slope without having learned first how to slow up and stop. Or he will grow impatient at the pace of the learning process and will attempt feats that may look easy but are far beyond his skill.

It takes more strength and skill than the beginner realizes to check himself safely at the mile-a-minute speed which may be developed down steep runs.

The novice on skis is in less danger than the skier who has been out a few times. The latter is inclined to be overconfident and to pick slopes too steep for his skill and strength.

Stop before you get tired is another important safety rule in skiing as in other sports. Fatigue has been found to be a large factor contributing to skiing accidents. When you are tired you are less likely to attend closely to what you are doing and may miss seeing little irregularities of trail or slope. Visibility is not so good in late afternoon and this makes it harder to pick a safe course even if you are not tired.

Even though first aid stations, safety patrols and special trails for novices are available at many ski resorts, skiing, like swimming, should not be undertaken alone. Even a slight accident may end disastrously if there is no one along to help or to get help.

Beginners should remember that sudden changes in temperature and weather conditions may completely alter the safety of a trail. Soft snow hardens and becomes crusted. Hard packed trails become icy with use. At the place where you made turns safely an hour ago, you may find yourself skidding into the woods at greatly increased and dangerous speeds.

Science News Letter, January 19, 1952

IN SCIENCE

BIOPHYSICS

Ultrasonics Possible Aid to Eye Cataracts

► ULTRASONIC WAVES, sound waves that vibrate so fast they cannot be heard by human ears, are giving doctors a new approach in the search for a medical cure for cataracts of the eyes.

The hope that ultrasonic treatment itself might even become a cure for cataracts was expressed by Dr. Oscar Lavine of Washington, D. C., at the meeting of the Panamerican Congress of Ophthalmology in Mexico City.

So far, this hope has not been realized. But Dr. Lavine and associates at St. Elizabeth's Hospital, the National Institutes of Health and the Catholic University of America have been able to produce cataracts in the eyes of dead calves by ultrasound treatment.

By using a different frequency of ultrasound waves, Dr. Lavine believes it might be possible to break up cataracts.

Even if this never can be done, the ultrasonic cataracts, which can be produced within seconds in any desired area of the eye lens and of any size, should give scientists a good tool for testing potential cataract-curing medicines.

Surgical operation is the present method of curing this blinding eye condition.

Science News Letter, January 19, 1952

MEDICINE

Diabetics More Likely To Have Tuberculosis

► DIABETES PREDISPOSES to tuberculosis, five medical scientists of Philadelphia declare in a report to the National Tuberculosis Association.

The five are: Dr. Katharine R. Boucot of the Woman's Medical College of Pennsylvania, Dr. David A. Cooper of the University of Pennsylvania School of Medicine, Dr. Edward S. Dillon of Philadelphia General Hospital, Paul Meier, statistician of the Philadelphia Tuberculosis and Health Association, and Dr. Russell Richardson of the University of Pennsylvania Hospital.

Their statement is based on a survey of tuberculosis among diabetics conducted under the joint auspices of the Philadelphia County Medical Society and the Philadelphia Tuberculosis and Health Association.

Twice as much total tuberculosis was found among the diabetics as among the non-diabetics in this survey. Almost three times as much active tuberculosis was found among the diabetics as in an industrial group in the city.

Science News Letter, January 19, 1952

SCIENCE FIELDS

PSYCHOLOGY

Air Force Seeks to Spot Arctic Weather Types

► THE AIR FORCE is trying to find out how to tell an Arctic type man from the rest of us.

Tests now being conducted on a group of volunteer airmen at the Air Force School of Aviation Medicine at Randolph Field, San Antonio, Tex., may be valuable in revealing the sort of temperament, physical constitution and background that enable a man to adapt himself to working at Air Force bases in Arctic regions. The tests are being conducted by Lt. Robert A. McCleary, a research psychologist formerly of Johns Hopkins University in Baltimore.

The volunteer Arctic airmen, dressed in Air Force clothing designed for Alaska duty, do tasks with their hands in a chamber chilled to 50 degrees below zero. They all work on a box designed for the tests by Lt. McCleary. Roughly the size of a tool chest, it is securely fastened with bolts and safety wire. The airmen must open the box with pliers and a wire cutter, take out the brush assembly they find inside, disassemble that, put it together again and then finally lock it back in the box.

The skills utilized in performing these tasks, according to Lt. McCleary, are the same used by ground crew repairmen working on Arctic air base maintenance lines.

Lt. McCleary hopes, by comparing results from different airmen, to learn something about the effect of extreme cold on mechanics' work. In addition, he should be able to find out why some men do better than others in cold weather.

Science News Letter, January 19, 1952

MEDICINE

Seasickness Remedy Used For Ulcerative Colitis

► DRAMAMINE, BEST known as a remedy for seasickness and other motion sickness, may prove to be a cure for chronic ulcerative colitis.

Good results with this medicine in 14 patients are announced by Dr. Clifford C. Wilson of Kansas City in a report to the Kansas City Southwest Clinical Society.

Four of the patients were "candidates for surgical intervention" but did not have to be operated, thanks to the dramamine treatment, Dr. Wilson states.

Chronic ulcerative colitis is a disabling disease for which neither cause nor cure is known, Dr. Wilson points out. Some

SCIENCE NEWS LETTER for January 19, 1952

41

authorities believe it has a basis in emotional difficulties because many, if not all, patients have neurotic traits. Others think allergy to foods plays an important role. Because dramamine has the combined effect of a mild sedative and a mild antihistaminic, useful in allergy, Dr. Wilson decided to try it. It has the additional advantages of being nontoxic when taken over a long period, nonhabit forming and inexpensive.

He prescribed it to be taken before meals and at bedtime, along with a high protein low residue diet. Blood transfusions were given when needed to correct anemia. After two years experience with it, Dr. Wilson believes that "the more serious cases of chronic ulcerative colitis can be controlled satisfactorily and indefinitely."

"With control over a long period," he states in his report, "it seems reasonable to assume that a cure will be the end result."

Science News Letter, January 19, 1952

MEDICINE

Discover Body Defense Against Pneumonia

► AN "IMPORTANT defense" of the body against particularly dangerous pneumonia and streptococci germs has been discovered by scientists at Washington University School of Medicine in St. Louis.

The defense is carried on by certain white blood cells. Before the body has had time to build up specific antibodies to germs, these white cells mobilize and trap the germs against the walls of the blood vessels. Sometimes the white blood cells trap the germs against other, adjacent white blood cells. After trapping the germs, the white blood cells act like other scavenger cells from the liver and spleen, and devour the germs.

The germ-trapping and devouring action of the white blood cells, called intravascular surface phagocytosis, was found in researches by Drs. W. Barry Wood, Jr., William D. Perry, John W. Berry and Miss Mary Ruth Smith. They report details of the research to fellow scientists in an official publication of the Rockefeller Institute for Medical Research, the JOURNAL OF EXPERIMENTAL MEDICINE (Dec. 1).

When bacteria get into the blood stream, the patient is seriously ill, the scientists point out. Even with sulfa drugs, penicillin and other antibiotics, this state must "still be looked upon as the forerunner of possible disaster."

Because of the often grave results of blood stream infection, doctors have often looked on the blood as having only the weaker sort of anti-germ defense. This view has been taken particularly with regard to pneumonia germs and streptococci which have capsules that protect them from being devoured by scavenger cells from the liver and spleen.

Science News Letter, January 19, 1952

GEOLOGY

Oil Shale and Coal Are Future Energy Sources

► OIL SHALE and coal will furnish the power of the future, geologists of the nation agree.

The American Geological Institute in Washington in a survey finds that these experts are not confident that atomic energy will find substantial industrial use even by the year 2000. Water power and solar energy will also play a role minor to processed oil shale and coal.

By 1975 direct production of natural petroleum will be past its peak, the geologists agree, and oil imports will be insufficient to meet America's needs. The large oil shale deposits of the Colorado plateau and the low grade coals of the Midwest and plains area will supplement the declining supplies of natural petroleum. Powdered coal will replace industrial fuel oil. Coal production should double within 25 to 30 years, with most of this increase used as liquids or gases rather than in solid form.

New light-weight metals, such as titanium, will find extensive use in the future, the geologists believe, because methods will be developed to extract them more easily from the earth.

Twice the present supply of 15,000 geologists will be needed in the near future to explore for new mineral supplies by geological and geophysical methods, aid construction industries and work on agricultural problems, the Institute predicts.

Science News Letter, January 19, 1952

INVENTION

Fiberboard Soybean Glue Is High-Grade at Low Cost

► THE SOYBEAN, rapidly becoming one of America's principal agricultural crops, is the basis of a glue particularly suitable for the manufacture of high-grade, low-cost fiberboard made by a process awarded a patent recently. It is for use primarily in the manufacture of industrial laminated paper containers such as cartons, boxes and barrels.

Inventors are Glen E. Babcock, Vernon L. Johnsen and Allan K. Smith, Peoria, Ill. Patent 2,580,391 was the award. Rights are assigned to the United States government as represented by the Secretary of Agriculture.

The glue is about 20 parts soy flour and soy protein, more of the flour being used as a rule than the protein. To this is added from 2.5 to 10 parts of a solution containing an ammonium resin and its alkali metal salt, a similar amount of saponified rosin and from 10 to 15 parts of an 8% sodium hydroxide solution. The fiberboard made with this glue has good water resistance and high strength.

Science News Letter, January 19, 1952

MILITARY SCIENCE

Air Defense Plans

Nation's air defense command is planning for probable night attack by "copy-cat" B-29 bombers of the Soviet Union. Radar and civilian observers will spot and track them.

By WADSWORTH LIKELY

► IF AND WHEN the Soviet Union sends its copy-cat B-29 bombers, loaded with A-bombs, against us, they will be sent at night, and they will fly hugging the ground or the oceans.

This nation's Air Defense Command is preparing for this sort of tactics.

Jet planes and radar together have made night attacks, close to the ground, necessary to the Soviet Union. We found that out in Korea. Our B-29's have largely abandoned the practice of flying in groups in the daytime against North Korean targets—the Soviet MIG's have made this the prudent course. Instead, our bombers mostly go over singly at night. Radar in their noses makes night almost like day so far as recognizing and hitting targets is concerned.

What we have learned in Korea about bombing attacks, the Russians also have probably learned. It is even more probable that the Russians will copy our tactics since their long range bombers are copies of B-29's which landed, disabled, in Siberia, during the days when we were sending them in numbers against Japan. But for the Russian insignia, you could hardly tell the difference between theirs and ours.

Just what is it that we intend to do about the possibility of attack with A-bombs by Soviet bombers?

Air Force Has Responsibility

The United States Air Force is charged with the responsibility of active defense against enemy air attack. It has set up the Air Defense Command with headquarters in Colorado Springs, Colo. Adjacent to the ADC's headquarters, is the headquarters of the Antiaircraft defenses of the nation. Presumably, managed from Colorado Springs are the defenses of the entire North American continent, integrating the Canadian defenses as well.

Many weapons are at the disposal of the top brass at Colorado Springs. First is the great radar network spread across the top of the American continent, in the frozen wastes of the Canadian north.

This country has appropriated a total of \$295,000,000 for this network of electronic eyes. Air Force Chief of Staff Hoyt Vandenberg indicated recently that the network is about completed.

Radar units send ultra-high frequency radio signals bounding out into the sky at the speed of light. If they hit an obstacle,

such as a plane—or a mountain—they bounce back. A radio receiver hears these bounced signals and, through a complicated series of electronic tubes, the difference, almost infinitesimal, between the time the signal was sent and the time it was received back is translated into the distance of the obstacle from the station, its height from the ground and the direction from the station.

Radar is miraculous, but it is a miracle with limitations. It can "see" to the moon, but it cannot see what is behind a hill. Nor can it see what is under the curvature of the earth. A radar's range, insofar as airplanes are concerned, is about 250 miles, provided the planes are high enough. A plane hugging the surface of the earth cannot be detected by a radar until it is "visible" on a straight, unencumbered, line.

That is why Soviet bombers will hug the surface. And that is one reason why we have the civilian-manned observation posts of the Aircraft Warning Service. We expect that those enemy bombers which slip through holes in the radar net, caused either by hills or the curvature of the earth, will be picked up by volunteer civilians who are expected to man the thou-

sands of observation posts set up in this country and in Canada.

There is another reason for civilian plane spotters. The radar net covers those planes it picks up only while they are within range. As an enemy plane moves down from the far north into the interior of the continent, the responsibility for tracking it, and therefore forecasting the direction in which it is traveling, will rest largely with these civilians.

Once the enemy bombers are picked up by radar in the far north and once they are being tracked by volunteer civilians, how do we bring them down before they can reach their targets?

We have planes with bullets and rockets, we have antiaircraft with conventional projectiles and with guided missiles.

On Continuous Duty

All air squadrons in the Air Defense Command are on seven-day-a-week, 24-hour duty. They are supposed to be able to take off in their fighter-interceptors within 60 seconds after they receive warning from the Aircraft Warning Service. Some of them have reached this peak of proficiency.

Our Air Defense squadrons are now mostly equipped with jet planes. Some of the National Guard squadrons called up for duty in the Korean emergency are still equipped with the "out-dated" propeller-driven P-51's.

The jet planes assigned to Air Defense fighter-interceptor squadrons are designed for all-weather, day and night defense. Radar-equipped, they can seek out the enemy bombers, with the information supplied them by ground radar and volunteer observers, in the darkest night, through the heaviest storm.

Three types are being used by the Air Defense Command, the F-86D, the F-89 and the F-94—the majority of our squadrons are equipped with the F-86 and the F-94. All are in the 600-mile-an-hour and above class, all have ceilings over 45,000 feet. The F-86 carries 24 "Mighty Mouse" rockets, the F-89 carries 16 five-inch high velocity rockets, the F-94 carries eight five-inch rockets or 24 2.75-inch "Mighty Mouse" rockets. A new electronic nose for night fighting goes with the F-94.

Air-to-air guided missiles are not yet an operational reality, although it can be counted on that many experiments are being conducted in shooting down planes with guided missiles launched from fighter-interceptor planes.

It is from the ground that the guided missiles can now soar into the sky and seek out the enemy bomber. The Antiaircraft Command is training officers and enlisted men in control and maintenance of



F-94 FIGHTER-INTERCEPTOR—
Planes such as this, with electronic noses, are ready to take off within 60 seconds after receiving notice of enemy bombers. They are manned 24 hours a day, seven days a week.

guided missiles to be used against enemy planes. How extensive are the installations is a closely held secret.

Of course, the Antiaircraft Artillery has the more conventional weapons to use against enemy bombers—huge 120 millimeter guns which can shoot their missiles 40,000 feet or higher into the air, 90 millimeter, 40 millimeter guns and .50 caliber machine guns—the latter to take care of the low-flying planes.

Preparations Improved

The AAA is under the operational control of the Air Force's Air Defense Command. Someone must decide whether planes or ground guns are to be used against enemy attackers, else our guns would be shooting into our planes.

There have been varying estimates as to how successful this active defense against enemy bombers will be. Some say that only 20% of the bombers in any attack will get through to their targets, others say we cannot prevent 80% of them from getting through. Whatever the percentage, it is true that we are far better prepared to meet them now than we were before Korea. A Senate Preparedness Subcommittee came back from Alaska recently to report that Alaska would never be another Pearl Harbor. On the edge of most cities—primary targets—are keen, alert young men, ever prepared to dash within seconds to their jet planes, ready to take to the skies. Dotted over the landscape are the AAA guns and guided missile sites. In the far north are the weird radomes—encasing in fabric, with the help of air under pressure, the electronic eyes which shall warn us of approaching danger. And backing them up is a volunteer army of civilian observers who, day or night, in bad weather and good, are ready to track the enemy on his death dealing path and to thwart his design.

Science News Letter, January 19, 1952

MEDICINE

Begin Tropic Diseases Project for Pacific

► THE PACIFIC Tropic Diseases Research Project has been established at the University of California at Los Angeles, under the direction of Dr. John F. Kessel of the U. C. L. A. Medical School, who is now in Tahiti.

It is supported by grants from Cornelius Crane, Chicago plumbing manufacturer, William A. Robinson, author of "Ten Thousand Leagues Over the Sea," who makes his home in Tahiti, and the Church of Jesus Christ of the Latter Day Saints (the Mormons).

It will continue the investigation of filariasis, study the recent outbreak of poliomyelitis in Tahiti, and engage in research on other tropical diseases such as leprosy.

Science News Letter, January 19, 1952

PLANT PATHOLOGY

Oak Wilt Hits 7 New States

Deadly forest disease discovered attacking trees in seven more states in 1951, bringing to 18 the number of states whose oak stands are threatened.

► OAK WILT, deadly forest disease threatening oak stands throughout the eastern half of the country, attacked trees in seven more states during 1951.

Newly-discovered infected areas in Kentucky, Maryland, North Carolina, Tennessee, Virginia and West Virginia bring to 18 the number of states whose oaks have been hit by this virulent fungus disease. Oak wilt in Michigan, spotted in 1951, was reported in October.

Oak wilt is a fast killer, an inoculated tree being dead a few weeks or months after infection. That it is also a spreading disease "makes a much more dangerous situation," Dr. Curtis May of the U. S. Department of Agriculture and member of the National Oak Wilt Research Committee points out.

No one yet knows exactly how the infection jumps many miles to attack healthy trees. Birds and insects may pick up the deadly spores and carry them away, forest pathologists believe, but this theory has not been proved. However the disease

spreads, it has fanned out from the Wisconsin-Minnesota area east to states bordering the Atlantic and south to Arkansas.

Finding stricken areas in seven more states considerably extends the previously known regions of infection. Although spotting the affected trees from the air is cheaper and faster, in mountainous regions surveys must be made from the ground.

Color pictures taken this past summer of Wisconsin forests show that the disease has been established there perhaps 25 to 40 years, a much longer time than in the Ozarks, for instance, where it is only 8 to 10 years old. This means, Dr. May says, that the disease is probably not native to the United States, for if it were, all oak trees here would have been killed off long ago.

Oak wilt is caused by the fungus, *Chalara quercina* Henry. The near perfect stage for the fungus is one which carries it over the period when it might otherwise die. Called perithecia, this stage has now been produced for oak wilt fungus in cultures from a single tree for the first time. It may be produced under the bark of oak trees, where insects and birds could easily pick up the sticky spores. Drs. George H. Hepting, E. Richard Toole and John S. Boyce, Jr., of the Agriculture Department's division of forest pathology in Asheville, N. C., are now studying the tree, #419, that produced the perithecial stage in culture.

Cutting the roots before infection has passed through root grafts to other trees is one method of halting oak wilt's spread. Another way to curb local transmission of the fungus is to kill with poison healthy trees within a radius of 20 to 40 feet from diseased trees.

Science News Letter, January 19, 1952

AGRICULTURE

Sugar Beet Molasses Gives Vitamin for Poultry

► MORE VITAMIN B-12 for faster growing poultry and hogs is now available on a commercial scale. It comes from fermenting sugar-containing by-products such as sugar beet molasses with bacteria.

Development work on the new process was done by the U. S. Department of Agriculture at its Western Regional Research Laboratory in Albany, Calif., in cooperation with Washington State College and the Institute of Agricultural Sciences at Pullman, Wash.

Science News Letter, January 19, 1952

PASSAIC RIVER BRIDGE—to take advantage of high tide and low winds, two of the giant 173-ton haunch girders used to make the Passaic River Bridge were erected at night. This picture shows where the work to complete the longest girder span bridge in the U. S. stood at sunrise.



BIOPHYSICS

Geiger Counter Diagnoses Missed Thyroid Disease

► A SUPER-SENSITIVE Geiger counter known as the beta scintillation counter has been used by Los Angeles doctors in diagnosing hard-to-find thyroid diseases in more than 100 patients.

Dr. Thomas F. Barrett, clinical professor of medicine at U.C.L.A. and chief of professional services at the Veterans Administration General Medical and Surgical Hospital, reports this method picks up many thyroid conditions missed by other diagnostic means.

The machine, developed by Dr. Benedict Cassin of the U.C.L.A. Atomic Energy Project in 1949, has been used for the past four months.

A patient is given a small dose of radioactive iodine, about one to two microcuries. This very safe dose is about one-half to one-fourth the amount of radiation a person gets during a normal chest X-ray.

Since the thyroid acts as a scavenger for the iodine, a "scintogram" of the gland can be taken by recording the radiation given off by the iodine in the gland. For instance, if cancer is present, it will record as a white spot on the scintogram.

Science News Letter, January 19, 1952

PSYCHOLOGY

No Marriage Success If Overly Self-Conscious

► FOR A successful marriage, don't be "overly self-conscious."

As used by Dr. James F. T. Bugental, assistant professor of psychology at the University of California at Los Angeles, "overly self-conscious" doesn't mean being embarrassed, but means "overly concerned with his or her self." If not checked, he holds, this tendency produces a chain reaction which can lead straight to the divorce court.

"This self-concern creates anxiety which blinds one marriage partner to the other's needs," he says. "In turn, neglect of the other causes the neglecter to be condemned, increasing the anxiety and tension. Something finally has to yield and the divorce court is usually the answer."

"However, each partner should genuinely feel comfortable with himself so that he doesn't find it necessary to constantly boost his own ego at the expense of marriage."

But, if the spouse is "marriage-conscious," marriage will generally be a success, Dr. Bugental finds.

The "marriage-conscious" partner welcomes criticisms and evaluations, and will not become hurt by constructive criticism. This starts a chain reaction in the other direction, with happiness increasing as his respect grows."

Science News Letter, January 19, 1952



Don't Shoot

► SHOOTING AT owls and hawks is a good deal like shooting at night watchmen and policemen—except that the owls and hawks cannot shoot back.

All they can do is die if hit, or leave the neighborhood if they escape our lead, thereby giving free entry to our valuables to thieves whose activities are normally held in check by their presence.

True, one or two species of hawks steal chickens occasionally. True, also, owls are hated by other birds, which "gang up" on them whenever they find one by daylight in an exposed place. But to condemn the great majority of harmless and useful hawks for raids which they never commit, and to make common cause with bluejays and wrens against stray owls for their rather rare nest robberies, is simply an

ignorant neglect of our own biological interests.

Predators, killers, owls and hawks undoubtedly are. But the prey they kill consists overwhelmingly of small rodents and other creatures that we human beings commonly label as vermin. Owls without exception, and hawks with only two or three exceptions, are our allies, not our enemies. They deserve our gratitude, not our gunfire.

Owls especially are valuable as flying mousetraps. They are active when the rodents are most likely to be abroad. Although, contrary to a widespread notion, they cannot see in the dark, they have little trouble doing highly effective hunting in the dim twilight of late evening and pre-dawn, or in the light shed by even a sliver of a moon.

They are noiseless fliers, so that the rodent quarry has no warning of his impending doom until the sharp talons close on him.

Beginning now, and lasting until spring, is the time when the pressure of owl and hawk hunting on the rodent populations is most effective, from the human point of view. Food supplies are shortest in the woods and fields, so that hunger drives many wild species to raids on our grain and other stores, to gnawing on the bark of young orchard trees, and to many other destructive practices. At the same time, their numbers are at the lowest ebb of the year, for breeding is nil with most species.

Every potential mouse parent taken out now means one family fewer among our undesired dependents next year. Owls should therefore be left unmolested in their volunteer role of rodent control agents.

Science News Letter, January 19, 1952

MEDICINE

Fat Men Cold-Insulated

► FAT MEN are better insulated against winter's cold than heavy muscled men. This has long been suspected but now scientists have for the first time measurements showing it to be true.

The measurements were made by Drs. H. Stafford Hatfield and L. G. C. Pugh of the Medical Research Council Laboratories at Holly Hill near London.

They made their measurements on pieces of human fat and human muscle obtained from hospital post mortem examinations. The insulating quality of fat has heretofore been measured only on beef tissue.

The human tissue pieces used by Drs. Hatfield and Pugh were about one-third of an inch thick and about two by two inches in area. The pieces were put between two thin glass plates. In the center of one side was a heat flow disk with a thermo junction connected in opposition to a similar junction on the other side of the specimen of muscle or fat.

Two such assemblies, one with fat and the other with muscle, were put in an incubator with a woven wire resistance heating mat sandwiched between them. A current of heat was made to flow through the two specimens. The flow was at right angles to their planes in the center, where it was measured by the disk, while the difference of temperature between the two sides of the specimens was measured by couples. The thermal conductivity was determined by multiplying the heat flow by the thickness of the specimen and dividing by the temperature difference.

Muscle turned out to be more than twice as good at conducting heat, showing fat to be over twice as good at insulating as muscle. The actual ratios, for five samples, ranged from 1.08 to 2.6. The thermo electric heat flow disk was devised by Dr. Hatfield. Details are reported in *NATURE*.

Science News Letter, January 19, 1952

BIOCHEMISTRY

A-Bomb Use for Old Drug

Decade-old drug will pick up life-saving role in case of atom bomb attack. Made from animal blood, drug is called lipo-protein-nucleic acid complex.

► A DRUG that has been on the market and in use for over a decade will have a new life-saving role in case of atomic bombings.

The drug is a complex protein chemical derived from animal blood. Its potential new use is foreseen by Col. Ralph M. Thompson, deputy director of the Armed Forces Institute of Pathology in Washington.

The drug should be included in medical stockpiles wherever radiation hazards exist or may exist, Col. Thompson advises. By this he means stockpiling not only in defense medical supplies in preparation for possible atomic bombings but also in hospitals and other institutions where X-rays, radium and radioactive isotope chemicals are in use for treatment of cancer or for research purposes.

Scientifically named lipo-protein-nucleic acid complex, the yellowish liquid preparation has the tradename Reticulose. It has been given to patients previously by injections into the muscles as a means of giving them extra protein and to fight infection.

Its possible new anti-A bomb effect is foreseen from tests on animals conducted with Dr. L. J. Berry of Bryn Mawr College and Dr. R. B. Mitchell, U. S. A. F. School of Aviation Medicine, Randolph Air Force Base, Tex., where Col. Thompson was chief of pathology.

In these tests the animals, after irradiation, showed greater resistance to infection and stimulation of white blood cell production. The white cells of the blood are an important defense of the body against disease germs. Heavy doses of radiation damage the organs that form the white blood cells, thus lowering the body's resistance to infection. This is estimated to have caused many of the deaths of persons who survived the immediate radiation effects of the atom bombings in Japan but who died a few weeks later.

Great saving of lives among this class of victims might be achieved in future, Col. Thompson believes, using Reticulose.

The drug is produced by Chemico Laboratories, Inc., of Indianapolis. Increased production for further research along the lines indicated by Col. Thompson's studies is now under way. Method of making the drug and its exact source have not been published and will not be now, B. E. LaPenta, vice-president of Chemico Laboratories, states. He gives as reason for this the fact that publication now of the method of preparing the drug might "become automatically valuable to a potential enemy."

Col. Thompson's report appears in the *MILITARY SURGEON*, official publication of the Association of Military Surgeons of the United States.

Science News Letter, January 19, 1952

TECHNOLOGY

Home Movie Screens

► TINY GLASS beads make home movies show up well on the screen, while a sheet of dead-white plastic with rows and rows of tiny holes punched in it gives a life-like quality to professional movies.

In the theater, everyone must be able to see the picture. Yet some sit directly in front of the screen while others are far to the side. At home or school, it is more important to have most of the light reflected back toward the most favorable seating area, in line with the projector and screen. So different screen materials have been designed to meet these special needs.

Theater screens are usually made of sheets of smooth, dead-white plastic that tends to reflect light uniformly in all directions. As large loud-speakers are placed behind the screen, the screens are perforated to let the sound come through so the actors

in the picture will appear to be talking. The tiny holes cause the loss of less than 10% of the reflecting surface.

Beaded projection screens are good to use when the projector can be placed directly behind most of the people in the audience. Screens of this type are most often used in school classrooms, churches and homes as they reflect the light back toward the most favorable seating area.

It is interesting to see how differently screen materials reflect light by testing them with a flashlight. If you direct the light from a focusing flashlight into a small mirror or shiny piece of metal, the light falls on the ceiling, wall and floor as you tilt the mirror up and down.

But when you tilt the beaded material, it reflects most of the light directly back toward the light source, irrespective of the

angle at which it is held. The dead-white plastic reflects the light pretty uniformly in all directions.

Two types of screen material now popularly used have been collected for you by SCIENCE SERVICE. In addition, the Motion Picture Kit demonstrates the old and new in motion pictures: several frames of Technicolor pictures from a recent feature movie are included, along with two animated cartoons which let you actually see the figures move. Magnetic and photographic methods of recording sound are also demonstrated. These specimens can be secured for the nominal price of 75 cents. Just write to SCIENCE SERVICE, 1719 N St., N. W., Washington, D. C., and ask for the Motion Picture Kit.

Science News Letter, January 19, 1952



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Books of the Week

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C. Ask for free publication direct from issuing organization.

ANNUAL REPORT OF THE TENNESSEE VALLEY AUTHORITY FOR THE FISCAL YEAR 1951—*Govt. Printing Office*, 190 p., illus., paper, 60 cents. State and local authorities in the Valley and the people they represent are participating and assuming responsibility to a greater extent than ever. This is regarded as a sign that the region is growing stronger year by year.

THE ARMY AIR FORCES IN WORLD WAR II: Volume III, Europe: Argument to V-E Day, January 1944 to May 1945—Wesley Frank Craven, James Lea Cate, Wilfred J. Paul and Albert F. Simpson, Eds.—*University of Chicago Press*, 948 p., illus., \$8.50.

THE BENLD METEORITE—Sharat Kumar Roy and Robert Kriss Wyant—*Field Museum of Natural History*, 12 p., illus., paper, 30 cents. Only a dozen of the nearly 1400 meteorites known to have fallen on the earth have struck and damaged property; this one came through the roof of a garage in Benld, Illinois, in 1938.

ELEMENTS OF PHYSICAL METALLURGY—Albert G. Guy—*Addison-Wesley*, 293 p., illus., \$6.50. A new introductory textbook for students with a general background in chemistry, physics, and mathematics.

FLASH DISTILLATION OF AN INDEFINITE NUMBER OF COMPONENTS—John R. Bowman and Wayne C. Edmister—*Mellon Institute of Industrial Research*, 4 p., paper, free upon request to publisher, University of Pittsburgh, Pittsburgh 13, Pa. Reprinted from *Industrial and Engineering Chemistry*, November, 1951.

HANDBOOK OF GEM IDENTIFICATION—Richard T. Liddicoat, Jr.—*Gemological Institute of America*, 3rd ed., 350 p., illus., \$5.00. One major change in this edition is the new chapter describing in detail all the important and many of the minor gemstones.

HOW TO PROTECT AND PATENT YOUR INVENTION—Irving Mandell—*Oceana*, 80 p., paper, \$1.00 (cloth, \$2.00). Another in the Legal Almanac series, for the layman or inventor not versed in patent law.

INVENTORIES OF APPARATUS AND MATERIALS FOR TEACHING SCIENCE: Volume III, Technical Colleges; Part 3, Agricultural Sciences—*UNESCO*, 139 p., paper, \$2.50. The lists, related to the corresponding curricula, will be of help to teachers in selecting equipment and are part of the program to help schools in war-damaged and underdeveloped areas.

KEYSTONES OF GOOD STAFF RELATIONSHIPS—Ellsworth Tompkins—*Govt. Printing Office*, Office of Education Miscellaneous No. 13, 16 p., illus., paper, 15 cents. Although the personality of the principal is the most important element, that only in a very small school do good relationships among teachers develop without conscious attention to certain basic rules, is the main theme of this publication.

MAGIC OIL: Servant of the World—Alfred M. Leeston—*Juan Pablos Books*, 237 p., illus., \$3.75. Stressing the political and economic aspects of the petroleum industry here and

abroad, the author in this non-technical survey attributes the industry's success to the operation of competitive free enterprise.

A MASTODONT TOOTH FROM SZECHWAN, CHINA—Dirk A. Hooijer and Edwin H. Colbert—*Chicago Natural History Museum*, 6 p., illus., paper, 15 cents. This fossilized tooth is the first one of the genus *Synconolophus* to be found outside of India.

REPORT OF THE COMMITTEE ON CHEMICAL ENGINEERING RESEARCH—Department of Scientific and Industrial Research, Advisory Council—*His Majesty's Stationery Office*, 36 p., paper, 40 cents. British needs for chemical engineering research cannot be met by existing facilities, the committee finds. Two things they feel would help are a central organization to acquire data needed to improve existing facilities, and better collection and interpretation of information.

SOMETHING CAN BE DONE ABOUT CHRONIC ILLNESS—Herbert Yahraes—*Public Affairs Committee*, 32 p., illus., paper, 25 cents. Prepared in cooperation with the Commission on Chronic Illness and the U. S. Public Health Service, this booklet is designed to give the layman an understanding of the problems of prevention, treatment, and care that are common to most chronic diseases.

THE STORY OF THE ROCKEFELLER FOUNDATION—Raymond B. Fosdick—*Harper*, 336 p., illus., \$4.50. Dr. Fosdick, who was president of the Foundation for twelve years, here tells the history of its nearly 40 years of large-scale philanthropy.

A SURVEY OF FARM MEAT-CURING METHODS—C. F. Dunker and O. G. Hankins—*Govt. Printing Office*, USDA Circular No. 894, 10 p., illus., paper, 10 cents. This study of the curing methods of more than 1300 farmers indicates a great variety of curing methods which may account for reported differences in quality.

Science News Letter, January 19, 1952

INVENTION

Rotted Tree Trunks Provide Wallboard Bonding Agent

► ROTTED TRUNKS of fallen trees in the forest are used to provide a bonding agent for wood fiber wallboard in a process on which a patent has been issued.

Wood decayed by brown rot is the type used. Brown-rot-producing fungi feed on the cellulose and non-lignin content of wood until only the lignin is left. In making the sheetwood suitable for use as lumber, the rotted wood and waste wood from the sawmill are passed together through machines which convert the material to fiber form.

Inventor is Worth C. Goss, Seattle, Wash. His award was patent 2,581,652. Rights are assigned to United States Sheetwood Company of the same city.

Science News Letter, January 19, 1952

• RADIO

Saturday, Jan. 26, 1952, 3:15-3:30 p.m. EST
"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Thomas H. Wickenden, vice-president of the International Nickel Company, Inc. and manager of its development and research division, discusses "Use of Nickel."

TECHNOLOGY

Hormone Spray Keeps Lemons Fresh in Storage

► FOR LEMONADE drinkers or lemon pie addicts: The life of lemons after they reach the packing houses has been increased up to 50% in the last two years by use of hormone sprays in the packing process.

Developed by scientists at the University of California's Citrus Experiment Station at Riverside, methods of treating with 2,4-D, or the closely related and more active hormone spray, 2,4,5-T, are now fairly generally used for reducing loss of lemons in storage.

The effect, explained Dr. Louis C. Erickson, is to keep the stem end, or button, of the lemon alive and green and prevent internal changes which accompany aging of the fruit.

Science News Letter, January 19, 1952

MEDICINE

Baby Born With Only One Lung Lives Nine Months

► A CASE rare in medical annals, that of a baby born with only one lung, is reported to fellow physicians by Drs. Saul Smoller and Reuben Steinholz of Harlem Hospital of New York City.

In the past 50 years less than 75 cases of this kind have been reported, the doctors found in searching medical records.

The baby, a Negro boy, was brought to the hospital at the age of nine months because of a bad nose and throat infection which had been getting worse. The baby died two weeks later, primarily because of a narrowed, swollen windpipe which created "an insurmountable problem" in treatment and also prohibited the doctors from diagnosing the real state of affairs while the infant was living.

After death the baby was found to have no left lung and only a short stump of bronchial tube on the left side. The right lung was enlarged and had ruptured into the left side of the chest. The heart was displaced into the left half of the chest and lying on top of it was an enlarged thymus gland. Blood vessels to the right lung were normal, but there were no lung blood vessels on the left side.

Details of the case are given in a report in the BULLETIN OF THE HARLEM HOSPITAL CLINICAL SOCIETY (Dec. 1951).

Science News Letter, January 19, 1952

ZOOLOGY

How Birds Migrate Baffles

Scientists still mystified by way in which birds, fish and insects find their way. Both their surroundings and their senses seem to be of basic importance.

► HOW MANY birds, fish and insects find their way in their travels and migrations is still a mystery to science, Dr. Donald R. Griffin, associate professor of zoology at Cornell University, told the Virginia Polytechnic Institute chapter of the Society of Sigma Xi in Blacksburg, Va. He spoke as a Sigma Xi national lecturer.

In the long distance migrations of fishes and birds both their surroundings and their senses seem to be of basic importance, he explained. Scientists still do not know with certainty either the environmental clue that is used by the migrating animal to maintain its bearings or the sensory mechanism called into play to convey into the central nervous system the relevant information that must somehow be derived from the environment.

Dr. Griffin studied bird navigation by following individual birds from aircraft and tracing in this way flights of 200 miles or more. The results demonstrate how complex such phenomena may be, and how easily one can be misled by attempts to erect theories in the absence of adequate evidence.

In a typical situation where birds had always been thought to fly a direct course to a distant goal, it turned out that they wandered extensively and deviated very widely indeed from the direct course. They appeared to be following flight paths that approximated large spirals and were suggestive of systematic exploration.

Scientists have found organs and structures in some animals, especially insects, which seem to be concerned with a directional sense that helps to orient themselves in their travels, Dr. Griffin said. A peculiar structure known as the pecten in the eye of birds is an example.

Bees have a form of celestial navigation that they use in their flights, while bats guide their flight through darkness with speed and precision by a sort of radar device. Bees use the position of the sun in the sky to guide their flight, Dr. Griffin explained, while bats emit cries of ultrasonic sound, inaudible to human ears, and listen to the echoes as they return from objects that lie ahead.

Science News Letter, January 19, 1952

NATURAL RESOURCES

Sulfur Shortage Continues

Critical chemical supply may become worse in 1952 as rearmament program gains momentum. Sulfur essential in making synthetic rubber, steel and fertilizers.

► CRITICAL SULFUR, essential in the making of synthetic rubber, steels, fertilizers and many other important products, will continue to be in short supply during 1952 as it was in 1951 although approximately 6,200,000 long tons were produced, it is predicted.

The shortage may become worse in 1952 as the rearmament program of the United States and its allies gains momentum, Langbourne M. Williams, Jr., president of Freeport Sulphur Company, predicted. Despite record production by the American brimstone industry, the discovery of a large new deposit and projects to develop three others, any significant increase in the overall supply of sulfur is at least a year away, he declared.

The newly discovered deposit at Garden Island Bay, La., near the mouth of the Mississippi River, will be the largest sulfur development anywhere in the world in

nearly 20 years, Mr. Williams stated. A production plant costing between \$10,000,000 and \$15,000,000 is being built by Freeport. It will produce about 500,000 long tons of sulfur a year but will not be in operation until late in 1953. Several other new deposits are under development by other companies but full needs for 1952 will not be met.

Of the 6,200,000 long tons of sulfur produced in 1951, 5,325,000 tons was elemental sulfur or brimstone from Gulf Coast salt dome deposits. Some 200,000 tons was sulfur recovered from refinery and sour natural gases, 400,000 tons was from the iron-sulfur mineral known as pyrites, and the remainder was obtained from smelter gases and other sources.

America's 1951 sulfur production would have met all domestic needs but it was not enough to meet both domestic and export demand. Friendly nations of Western Eu-

rope are dependent almost wholly on the United States for their industrial needs. To supply them, in part, approximately 1,300,000 long tons of Gulf Coast sulfur was sent them under government orders. Of this, the United Kingdom received 400,000 tons.

Science News Letter, January 19, 1952

NUTRITION

Peppers and Oils Blamed For Tourists' Sickness

► PEPPERS, TOMATOES and different oils used in cooking are to blame for much of the intestinal sickness and diarrhea suffered by travelers to Mexico, Spain and Italy, in the opinion of two physicians who report on the subject to the American Medical Association.

Germy contamination of food and drinking water is undoubtedly the cause of some of this often disabling sickness.

Reporting on such sickness in travelers to Mexico, Dr. L. Pellman Glover of Altoona, Pa., says:

"I have been there a number of times and have suffered from the complaint just as many times. It is most certainly caused in many persons by the peppers and tomatoes. When this food is not taken, there is no trouble. Liberal doses of bismuth constitute the best treatment."

The different oils used to prepare foods in Latin countries "has the cathartic effect of castor oil in many Americans," states Dr. Walter L. Bruetsch of Indianapolis.

In addition, he points out, herbs used in Mexican cooking act as a laxative.

"I have attended fellow travelers who were so ill they felt the end was near," Dr. Bruetsch relates.

A tourist in Italy who has been "plagued" by the "inconvenience" of this intestinal upset will suddenly be cured when he enters France. This, Dr. Bruetsch explains, is because food in France is mainly prepared with butter instead of oil. If the susceptible tourist goes on into Spain, he will promptly get sick again.

Physicians will find the reports of Drs. Glover and Bruetsch in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (Jan. 12).

Science News Letter, January 19, 1952

WASHINGTON SCHOOL COLLECTION

This collection has been popular for years in High Schools. It includes 20 of the most important and common Rocks and also 20 common minerals. Each of the 40 specimens is about 2" in size and imbedded in cotton in a strong partitioned box size 10½ x 16½ x 1½". A set of unlabeled small specimens for quiz and identification purposes is included without extra charge. Price \$7.00 prepaid. Booklet, Introduction to Geology for the Layman 50c, including complete geological catalogue.

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• **PLASTIC WHEELS** for roller skates will outlast present wood or fiber wheels and are less noisy, producing only a quiet hum. More important, they give a surer, tighter grip to the rink floor, thus reducing the danger of slipping during jumps, spins and turns.

Science News Letter, January 19, 1952

• **NON-SINKABLE** bathing suit resembles the conventional type but has built into it storage cavities into which gas from a tiny pressure tank near the waist may be discharged. The gas-holding compartments are so placed that buoyancy is provided where most needed.

Science News Letter, January 19, 1952

• **CEILING HEATER** in a unit with an overhead light and an air circulator is an all-electrical device suitable for small rooms. Its fan draws in air from near the ceiling, passes it through the electric heating unit, and forces it downward to circulate throughout the room.

Science News Letter, January 19, 1952

• **DISPOSABLE SYRINGE**, containing a single dose of atropine, is for use in an area in which an enemy has released the dangerous nerve gas. It is a small tin tube with needle attached, and can be used by most anyone to inject the drug into a muscle.

Science News Letter, January 19, 1952

• **IRONING PAD**, of material shown in the photograph, is built with an aluminum

Do You Know?

French missionaries of early days who found the wholesome cereal known as wild rice growing along Wisconsin rivers called it wild oats.

Snakeskin seems to be a preferred material in nest-building by some birds, including the bulbul of the Philippines.

Paper with high tensile strength both when dry or wet is now being made of a regular paper pulp to which a synthetic rubber known as neoprene is added in latex form.

Glass as an engineering product can be made lighter than cork and almost as heavy as iron; it can also be made in mechanical strength stronger than cast iron.



soil center that is said to bounce back heat to the underside of the material being ironed. There are perforations in the foil

to provide ventilation and keep the pad dry. This pad is claimed to be a time-saver.

Science News Letter, January 19, 1952

• **CIRCUIT ANALYZER** for a blind radio engineer enables the person to make tactile readings of resistances, voltages and currents. It has a braille dial which may be turned until no sound is heard in connecting ear phones. It is a precision instrument.

Science News Letter, January 19, 1952

• **SPIRIT DUPLICATOR**, for use in an office for duplicating printed or written matter, is similar to other duplicators of the type but has many improvements and is portable, weighing 12 pounds. It will reproduce pages from postcard size to that of the ordinary business letter.

Science News Letter, January 19, 1952

• **PROTECTION GLOVES** for workers in chemical plants are an improved type made of canvas coated with a durable vinylite resin that has high resistance to acids, solvents and abrasion. They are available in gauntlet and knit-wrist styles.

Science News Letter, January 19, 1952

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